Telecommunications Consulting Group, Inc.
1133 20th Street NW, Suite 800, Washington, DC 20036
(202) 419-3357 • fax (202) 955-5059 • jgw@teleconsultinggroup.com

Some Regulatory and Public-Policy Guidelines for Customer Premises Equipment and Inside Wiring Competition in the Eastern Caribbean

By

John G. Williams

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0 Summary

This report is written to help telecommunications regulators in the Eastern Caribbean to create an environment for competition in customer premises equipment (CPE) and inside wiring. Such competition is the oldest and, arguably, the most successful form of telecommunication competition. For example, the US database of CPE devices registered for connection to local exchange carrier (LEC) networks now contains about 30,000 entries, and about 3,000 new products are registered each year. CPE and inside wiring competition also have been implemented successfully by regulators in many other countries throughout the world.

Implementing CPE and inside wiring competition is not a matter of “high policy” but is more concerned with practical, “nuts and bolts” issues. This manual was created accordingly. Nine specific tasks that must be accomplished by regulators or other public-policymakers are discussed. These tasks are:

- Establish the demarcation point;
- Divest Cable and Wireless (C&W) of CPE and inside wiring;
- Establish transitional procedures;
- Establish new customer agreements and procedures for C&W;
- Establish procedures to certify inside wiring installers;
- Adopt standards to prevent harm to the LEC network;
- Adopt standards to prevent harm to users and property;
- Adopt performance and compatibility standards; and
- Publicize the program.

Most of these tasks are administrative functions that can be performed by the regulator without reference to outside material. However, the standards discussed in this report have been developed by other bodies, so the tasks involving standards require further explanation. To provide this, the final section of this report presents more detail on these standards and the processes by which they are created.

1 Introduction

This report analyzes the regulatory and public-policy issues related to the competitive provision of telecommunications inside wiring and customer premises equipment (CPE) and recommends specific policies that should be adopted to realize

such competition. This work is written specifically to help regulators in Barbados and in the five other Eastern Caribbean countries (St. Kitts & Nevis, Dominica, St. Lucia, St. Vincent & the Grenadines and Grenada) that have established the Eastern Caribbean Telecommunication Authority (ECTEL).

The next section of this report discusses nine specific public-policy and regulatory issues that must be addresses to implement competition in inside wiring and CPE.[1] Some of these tasks are conventional administrative functions that can be performed by the regulator acting alone, while other tasks require reference to standards that have been developed by other bodies. To provide further background information on these latter issues, the third and final section of this report contains more detail on these standards and the processes by which they are developed.

2 Key Regulatory and Public Policy Issues

Historically, inside wiring and CPE were provided by incumbent wireline-based local exchange carriers as the end points of their local networks. The process of establishing and maintaining competition in these facilities has thus involved two phases:

- the divestiture of the existing inside wiring and CPE from the incumbent local exchange carrier; and
- the establishment of conditions such that the incumbent and (possibly) new local exchanged carriers may connect to existing and new inside wiring and CPE.

Consistent with the above, this paper uses the general term *local exchange carrier* (LEC) to denote any wireline-based local telecommunications carrier that may be operating in the Eastern Caribbean service area, and the name *Cable & Wireless* (C&W) to denote the incumbent LEC that currently provides service to this region. Thus, “C&W” is used in discussing issues that affect that carrier uniquely while “LEC” is used in discussing issues that would affect any LEC in the region.[2]

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[1] The author of this paper realized that informal competition in CPE and inside wiring already may occur in Barbados and the ECTEL countries. Nevertheless, the principles discussed here should benefit both carriers and customers by placing that competition on a more orderly basis.

[2] Based upon experience in the United States and elsewhere, realizing wireline-based local exchange telecommunication competition may prove to be very

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The discussion below draws upon Jamaica's experience with implementing CPE and inside wiring competition. This experience is highly relevant, since the events are recent, the incumbent LEC in Jamaica is C&W, and the population of Jamaica is roughly comparable to that of Barbados and the ECTEL countries combined.[3,4]

The nine key regulatory and public-policy issues related to the competitive provision of inside wiring and CPE are now discussed.

2.1 Establish the Demarcation Point

The *demarcation point* is the point of connection between LEC outside plant facilities and the inside wiring or customer-premises terminal equipment at a subscriber's location. A demarcation point is needed for two reasons. If C&W is to be divested of inside wiring and CPE, then some point must be established that defines the physical extent of that divestiture. Second, once the divestiture has occurred, the demarcation point marks the boundary of ownership and maintenance and repair responsibilities between the LEC and the customer.

Experience in Jamaica

C&W of Jamaica plans to install a "master jack" at the point of demarcation on each customer line.[5] There will be no charge for this action and all installations are

difficult. C&W (or its successor) may be the only wireline-based LEC ever to operate in the Eastern Caribbean service area. Nevertheless, this paper maintains the distinction between C&W and other possible LECs so that the potential of local exchange competition is at least left open.

[3] The National Geographic *Atlas of the World* (Revised Sixth Edition, 1996) indicates that the population of Jamaica is 2,447,000, while the combined population of Barbados and the ECTEL countries is 728,000.

[4] The issue of size and scale is obviously quite important to any consideration of telecommunications regulation and competition in Barbados and the ECTEL countries. (Indeed, ECTEL was formed to aggregate enough population to allow certain regulatory functions to be performed.) Policies applicable to the United States, the European Union or Japan may not be appropriate to situations in Barbados and the ECTEL countries, where far fewer regulatory resources are available.

For example, Barbados and the ECTEL countries should never consider establishing their own processes to certify CPE. Besides the obvious problem of not having the means to perform this function, there is also the problem that equipment manufacturers likely would not submit to such certification to gain access to such a relatively small market. Thus, this paper assumes that existing certification processes in other countries will be used.

[5] Information on C&W in Jamaica was obtained from the company's Web site at

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scheduled to be completed within three years.[6] The master jack is fitted with two sockets: a "test" socket to simplify self-test by the customer, and a "phone" socket that connects with CPE directly or that connects with customer-owned inside wiring (which can include other jacks and which eventually connects with CPE).[7]

Before reporting a line fault to C&W, the customer is instructed to plug a telephone that is known to be working into the "test" socket of the master jack and to listen for dial tone. If the customer hears dial tone, then the problem is in the inside wiring or CPE.[8] Then, repairing the fault is the customer's responsibility. Otherwise, the customer is instructed to call C&W.

Discussion and Recommendations

The master jack, which seems like a very good means for customer self-test, is common in the United Kingdom but not in the United States. In Part 68 of the FCC's rules (discussed further below) the Commission is concerned with establishing the physical location of the demarcation point. For single home installations the FCC requires that "the demarcation point shall be a point within 30 cm (12 in) of the protector or, where there is no protector, within 30 cm (12 in) of where the telephone wire enters the customer's premises, or as close thereto as practicable." More complex rules determine the location of the demarcation point for multiunit installations.[9]

If regulators in Barbados and the ECTEL countries adopt Part 68 of the FCC's rules as a part of their own regulations (as regulators in Jamaica apparently did) then specifications for the demarcation point location also would be included. As a practical matter, given the wide variations of conditions found on customers' premises and the limitations of human patience, these rules may not always be

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http://www.cwjamaica.com/customerserv/main.html (last accessed on January 21, 2002) and from email correspondence with the Office of Utilities Regulation (which is the telecommunications regulator in Jamaica).

[6] The exact physical location of the master jack is not specified in any of the documents from Jamaica that we have seen.

[7] The jacks used in Jamaica (and in Barbados and the ECTEL countries) apparently are the same as those used in the United States (such as the RJ-11 jack for a single-line telephone).

[8] Using the "test" socket must result in isolating customer-owned inside wiring and CPE from the C&W network.

[9] See Section 105 of Part 68 of the FCC's rules (cited as 47 CFR 68.105) for the specification of the location of the demarcation point in the United States.

followed precisely in the United States or elsewhere where the regulations have been adopted.

2.2 Divest C&W of CPE and Inside Wiring

Once the demarcation point is established, inside wiring and CPE on the customer side of this boundary can be removed from the ownership of C&W and conveyed to the individual customers. In such a process, a distinction may be made between simple CPE and inside wiring (such as used by most residential customers) and more complex CPE, such as private branch exchange (PBX) systems used by business, industrial and institutional customers.

Experience in Jamaica

Effective June 1, 2000, the ownership of simple CPE and inside wiring in Jamaica was transferred from C&W to the customer of record. Customers were not changed for this change nor were they given a choice. PBX customers were not affected by this action.

Discussion and Recommendations

The main policy questions in the divestiture of CPE and inside wiring concern the matter of charging the customer and the issue of whether the customer is given a choice. For simple CPE and inside wiring, such as typically used by residential and small business customers, the matter is more straightforward. Economic analysis may well show that the customer has already paid for the CPE and inside wiring many times over.[10] Simply *giving* the inside wiring and CPE to the customer, as was done in Jamaica, would seem to be a simple and reasonable decision. Making such a change mandatory also would seem reasonable. This would avoid a hybrid arrangement that could result in confusion to the customer and additional costs to the carrier.

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[10] For example, in Jamaica the Ministry of Industry, Commerce and Technology reports that C&W's rental charge for a simple telephone instrument and related inside wiring was $23 per month. (See: http://www.mct.gov.jm/whats_new/wiring.htm (last accessed on January 21, 2002)). This charge in Jamaica is roughly comparable to the monthly charge for local exchange telephone service in the United States. Compared to CPE and inside wiring, this latter charge must recover the apportioned cost of far more facilities and equipment (including outside loop plant, local switching, tandem switching, interoffice trunks and operations support systems). This, relative to US rates for local exchange service, the monthly rates previously charged in Jamaica for simple CPE and inside wiring seem excessive.

More complex CPE and inside wiring, such as PBX systems, initially might be considered on a case-by-case basis. C&W and PBX customers might be given a period to reach a negotiated agreement for the transfer of assets from the carrier to the customer. Such transfer might involve a payment to C&W. If agreement could not be reached, then some form of regulatory facilitation or intervention might be necessary. Such action might take the form of arbitration, mediation or direct regulatory decision. The use of economic modeling to determine the residual value of the complex CPE and inside wiring could provide guidance in such a deliberation. After some reasonable period, the ownership of all complex CPE and inside wiring should be transferred to the end users.

2.3 Establish Transitional Procedures

Transitional procedures are just special, one-time rules for customers who may be establishing new service when CPE and inside wiring are divested from C&W.

Experience in Jamaica

Customers in Jamaica who had applied for service before June 1, 2000 (the divestiture date), but who had not yet received inside wiring or CPE from C&W, were responsible for providing their own wiring and telephone instrument. Customers who had inside wiring installed by C&W before June 1, 2000 were given a telephone instrument (and, of course, the inside wiring) even if service had not yet been activated. Network problems reported by the customer and logged by C&W before June 1, 2000 were repaired by the company, even if inside wiring or CPE was involved.

Discussion and Recommendations

The actions of C&W in Jamaica seem reasonable. Some simple set of rules is necessary to navigate the transition period.

2.4 Establish New Customer Agreements and Procedures for C&W

Once CPE and inside wiring have been divested, the terms and conditions of the service agreements between C&W and its customers must be modified to reflect these changes. Likewise, C&W billing systems must be modified to remove charges for CPE and inside wiring from customer bills, and maintenance systems must be modified to reflect the newly-truncated local network.

Experience in Jamaica

In Jamaica, C&W modified their customer agreement to reflect the CPE and inside wiring divestiture.[11] Provisions were inserted that:

- specified that simple inside wiring and CPE will be owned by the customer after June 1, 2000;
- required that the customer only connect certified CPE to the C&W network;
- required C&W to install master jacks according to a predetermined schedule;
- indicated that the customer is responsible for CPE and inside wiring beyond the master jack; and
- stated that the customer must pay for a service call if the problem is in the CPE or inside wiring.

Discussion and Recommendations

Again, the actions of C&W in Jamaica seem reasonable. This is another "housekeeping" task, but one that must be performed to bring agreements and procedures into conformity with the CPE and inside wiring divestiture.

2.5 Establish Procedures to Certify Inside Wiring Installers

CPE and inside wiring must meet three different types of standards:

- standards to prevent harm to the LEC network;
- standards to prevent harm to the user and user property; and
- standards to insure adequate performance and compatibility with the LEC network.[12]

Manufacturers of CPE have a strong economic incentive to meet these standards, because CPE markets are quite competitive and substandard equipment is unlikely to be profitable. The FCC, for example, has had very few problems with CPE manufacturers failing to meet its Part 68 requirements (which are designed to prevent harm to LEC networks). Inside wiring, however, is another matter. Such wiring is installed by individual workers on a case-by-case, place-by-place basis. More problems may be expected with inside wiring than with CPE.

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[11] Cable and Wireless Jamaica Limited, *Terms and Conditions of Service for Direct Line Customers,* http://www.cwjamaica.com/customerserv/tandcdirect.html (last accessed on January 21, 2002). See especially Sections 6, 7 and 25.

[12] Each type of standard will be discussed further in subsequent sections of this paper.

Experience in Jamaica

The regulator in Jamaica certified as inside wiring installers both current and former employees of C&W who were appropriately qualified. Also certified were graduates of specified vocational schools who were successful in approved courses. Additionally, the requirements (by the Government Electrical Inspectorate) to be an approved electrical contractor included coursework that qualified such contractors to install telephone inside wiring. For the public's convenience, the regulator has published a list of 39 individuals or firms who are qualified to install inside wiring in Jamaica.

Discussion and Recommendations

As the example in Jamaica shows, telecommunications inside wiring installers might be certified by using the same administrative mechanism applied to electricians or by using other means.[13] Such certification should require a familiarity with the work practices needed to install telecommunications inside wiring and a familiarity with the specifications contained in the various relevant standards documents.

Jamaica appears to require a certified installer for *all* inside wiring, although this is not so in the United States. For simple inside wiring (i.e., up to four lines for business and residential service) the FCC allows the subscriber or premises owner to install wiring on the subscriber's side of the demarcation point.[14] For more complex wiring, the job must be supervised by someone with the appropriate training and experience.[15,16]

2.6 Adopt Standards to Prevent Harm to the LEC Network

The FCC recognizes four types of network harm that may be caused by CPE and inside wiring and promulgates regulations at Part 68 of its rules to guard against these dangers:

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[13] Different countries use different procedures for training and certifying electricians. Often, an apprentice electrician must work under the supervision of a certified electrician for a designated time. After this, testing may be required before the apprentice is fully licensed.

[14] 47 CFR 68.213(b).

[15] 47 CFR 68.215(c).

[16] Recall that the FCC is only concerned with harm to the LEC network. In the US, other regulations, including state laws and city ordinances, may impose additional installer qualifications to prevent harm to the user and to property.

- electrical hazards to LEC personnel;
- damage to LEC equipment;
- degradation of service to persons other than the users of the subject terminal equipment and their calling or called parties; and
- malfunction of LEC billing equipment.[17]

Experience in Jamaica

Jamaica adopted Part 68 of the FCC's rules in their entirety. Jamaica also adopted FCC rules Part 15, which set out regulations under which intentional, unintentional or incidental radiators of electromagnetic energy may be operated *without* an individual spectrum license. Intentional radiators include cordless telephone systems and unintentional radiators include central processing unit boards as found in personal computers and in some sophisticated CPE. The likely reason for adopting Part 15 in Jamaica was to prevent electromagnetic interference from CPE.[18]

Discussion and Recommendations

In the United States, Part 68 of the FCC's rules is the primary regulatory mechanism for ensuring that customer-owned inside wiring and CPE do not harm the LEC network. (These rules are discussed further in Section 3.1 of this paper.) Such rules are necessary, and should be adopted by reference in the telecommunications regulations codified in Barbados and the ECTEL countries.

2.7 Adopt Standards to Prevent Harm to Users and Property

For many industrial sectors in the United States, standards dealing with the prevention of harm to life and property are promulgated by the Underwriters Laboratories (UL). The UL was founded in 1894 as a nonprofit organization to establish and operate laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property. The UL also

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[17] The FCC does not allow competitive CPE to be attached to party lines (i.e., one line serving more than one customer) because such lines require a device in the CPE to identify the calling customer (47 CFR 68.2(a)).

[18] Part 15 also contains a regulation more relevant to network harm. 47 CFR 15.214(d) states that "[c]ordless telephones shall incorporate circuitry which makes use of a digital security code to provide protection against unintentional access to the public switched telephone network by the base unit and unintentional ringing by the handset".

publishes standards, classifications and specifications for materials, devices, products, equipment, constructions, methods and systems affecting such hazards.[19]

Experience in Jamaica

In Jamaica, the following UL standards apply to inside wiring:

- UL 444 Communications Cables;
- UL 1581 Reference Standard for Electrical Wires, Cables, and Flexible Cords; and
- UL 1863 Standard for Communications-Circuit Accessories.

For CPE, the following safety standards apply:

- UL 94 Test for Flammability of Plastic Materials for Parts in Devices and Appliances; and
- UL 1459 Standards for Telephone Equipment.

Discussion and Recommendations

In the United States, the UL safety standards listed above are the primary specifications for ensuring that customer-owned inside wiring and CPE do not harm users or user property. (These standards are discussed in more detail in Section 3.2 of this paper.) Such standards are necessary, and should be adopted by reference in the telecommunications regulations codified in Barbados and the ECTEL countries.

2.8 Adopt Performance and Compatibility Standards

All of the standards noted above pertain to creating safe conditions and avoiding harm. Standards also must be established to ensure that the inside wiring and CPE will perform as intended and be functionally compatible with LEC networks. In the Unites States, many of the performance and compatibility standards for telecommunications equipment are established by the Telecommunications Industry Association (TIA),[20] which is a member of the Electronic Industries Alliance (EIA).[21]

Experience in Jamaica

In Jamaica, the following standard applies to inside wiring:

- TIA/EIA-568-A Commercial Building Telecommunications Cabling Standard.

For CPE, the following standard applies:

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[19] See: http://www.ul.com
[20] See: http://www.tiaonline.org
[21] See: http://www.eia.org

- TIA/EIA-470-B Telecommunications-Telephone Terminal Equipment — Performance and Compatibility Requirements for Telephone Sets with Loop Signaling.[22]

Discussion and Recommendations

In the United States, the TIA/EIA standards listed above are among those standards used to ensure adequate performance and compatibility. (The standards listed above, and other standards that regulators might wish to consider for adoption in the Eastern Caribbean, are discussed in more detail in Section 3.3 of this paper.) Such standards are necessary, and should be adopted by reference in the telecommunications regulations codified in Barbados and the ECTEL countries.

2.9 Publicize the Program

Obviously, merchants must be made aware of the opportunity to sell CPE in their stores and shops, electricians and other wiring installers must be made aware of the opportunity to install inside wiring as a new line of business, and C&W's customers must be made aware of the changed procedures and the new opportunities to acquire CPE and inside wiring competitively. All these public education functions must take place in a timely manner, well before the date at which C&W is divested of inside wiring and CPE.

Experience in Jamaica

We understand that C&W and the Office of Utilities Regulation in Jamaica did engage in such an educational effort, but no details of this program have been found.

Discussion and Recommendations

This item *is* obvious, and is only included here for the sake of completeness.

3 Standards and Standard Making Processes

This section of the report provides a more in-depth discussion of standards and the standard making processes than were mentioned in Sections 2.6 through 2.8

[22] In Jamaica, we were told that C&W "used a combination of US and European standards." This would seemed to be unusual if true in any significant way, because this would imply that C&W's network was an assemblage of incompatible elements. In fact, C&W Jamaica only specified one European standard, ITU E.161, *Arrangement of Digits, Letters and Symbols on Telephones and Other Devices That Can Be Used for Gaining Access to a Telephone Network*. This standard, while useful, has no effect upon C&W's network, and is the same as the United States/North American standard anyway.

above. The purpose of this section is to give regulators more background on various standards from the Unites States that may be appropriate for adoption in the Eastern Caribbean.[23]

3.1 Harm to the LEC Network

In its Carterphone decision in 1968, the FCC decided that CPE could be connected directly to LEC networks if a protective coupling device was used.[24] Before this decision, only CPE manufactured by the Western Electric Company (a subsidiary of the Bell System) could be connected to Bell System LEC lines. Further, customers could only rent CPE — purchase was not allowed. Other CPE manufacturers were limited to selling to "independent" (i.e., non-Bell System) LECs, which was a much smaller market.

The Carterphone decision opened the Bell System LEC market (which was more than 80 percent of the US market at the time) to CPE manufacturers other than Western Electric. However, the use of a protective device was still an area of frustration for these equipment vendors. Rent for the Bell protective arrangements was a recurring cost that made purchasing non-Bell equipment less attractive. The FCC, responding to these concerns, established its CPE registration program in 1975. CPE that could pass the appropriate requirements (contained in Part 68 of the FCC's rules) could be attached directly to LEC networks without the use of protective devices.

The CPE registration program has been very successful. The US database of registered CPE now contains about 30,000 entries (including equipment identification

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[23] This paper assumes that US standards are used by C&W in the Eastern Caribbean. This is consistent with what we have seen. Further, after repeated attempts, we have not been able to obtain any information to the contrary.

[24] This protective device, which protects the LEC network from potential harm caused by inside wiring and CPE, is not to be confused with the primary voltage protection device (typically found in the form of a gas discharge tube or carbon block) that protects inside wiring and CPE (and the customer) from transient high voltages on the LEC loop plant (i.e., the wire from the central switching office to the customer). These transient conditions can be caused by lightning strikes, accidental crosses with AC power lines, or induced voltages on the loop plant. Primary voltage protection devices are not considered in this paper, because they are not a part of inside wiring or CPE, but LECs should supply such protection as a matter of good engineering practice.

information, applicant identity and technical information) and about 3,000 new products are registered each year.

In 2000, the FCC moved to privatize many aspects of its Part 68 process.[25] The FCC established the Administrative Council for Terminal Attachments (ACTA) to adopt technical criteria and to act as the clearinghouse, publishing technical criteria for terminal equipment developed by American National Standards Institute (ANSI) accredited standards development organizations. ACTA does not make substantive decisions regarding the development of technical criteria.[26] ACTA also maintains the registration database of equipment approved as compliant with the technical criteria. Both functions previously were performed by the FCC.[27]

CPE manufacturers show conformity to the appropriate technical criteria either by seeking certification from a Telecommunications Certification Body (TCB — a testing laboratory), or by providing their own formal declaration of conformity to consumers and to the ACTA.

FCC rules continue to require that providers of telecommunications permit connection to the telephone network of any CPE that meets the technical criteria developed by the process described above. Further, aggrieved parties may request that the FCC conduct a review of the technical criteria adopted by the ACTA.

In its 2000 Order, the FCC retained CPE regulations in its Part 68 rules for telephone hearing aid compatibility and for telephones with volume controls.[28,29] Further, the FCC retained *all* of its rules related to inside wiring. For simple inside wiring (i.e., up to four lines for business and residential service) the FCC allows the subscriber or premises owner to install wiring on the subscriber's side of the

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[25] Federal Communications Commission, *In the Matter of 2000 Biennial Regulatory Review of Part 68 of the Commission's Rules and Regulations,* CC Docket No. 99-216, Report and Order, Adopted November 9, 2000, Released December 21, 2000.

[26] ACTA is jointly sponsored by the Alliance for Telecommunications Industry Solutions and the Telecommunications Industry Association. The FCC, in effect, transferred most of its previous Part 68 rules to the ACTA. These rules, as relocated from Part 68 to an ACTA standards document, appear as: TIA/EIA Interim Standard, *Telecommunications Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment To the Telephone Network*, TIA/EIA/IS-968, July 2001.

[27] See: http://www.part68.org

[28] 47 CFR 68.4 and 47 CFR 68.112.

[29] 47 CFR 68.6 and 47 CFR 68.112.

demarcation point.[30] For more complex wiring, the job must be supervised by someone with the appropriate training and experience.[31] None of these requirements apply if the inside wiring is behind a protective device of the type originally required by the Carterphone decision, although such devices are seldom used today.

The two primary types of harm that may be caused by inside wiring to the LEC network are hazardous voltages and longitudinal imbalance. The latter problem can increase crosstalk among various customers' circuits and, in this sense, can cause harm to the LEC network. Rules and procedures in Part 68 guard against these harms.

3.2 Harm to Users and Property

The UL standards specified in Jamaica (and listed in Section 2.7 above) are the primary requirements in the US for ensuring that customer-owned inside wiring and CPE does not harm users or user property. This section of the report provides more detail on each of these standards documents. Such documents usually specify the standards themselves, together with the methods required to test that the standards are satisfied. Safety standards for inside wiring are discussed first, followed by a discussion of standards for CPE.

UL 444 Communications Cables

This standard applies to multiple conductor jacketed cables and single or multiple coaxial cables for telephone and other communications circuits such as voice and data for on-premises customer systems. The cables may contain one or more optical fiber members. Issues considered in the standard include: the construction of the cable, tests to be performed during the manufacturing of the cable, tests related to the cable's capability, and standards for the marking of the cable.

UL 1581 Reference Standard for Electrical Wires, Cables, and Flexible Cords

This standard contains specific details of the conductors, of the insulation, of the jackets and other coverings and of the methods of test sample preparation, of specimen selection and conditioning and calculations that are required in the standards for Thermoset-Insulated Wires and Cables (UL 44), Thermoplastic-

[30] 47 CFR 68.213(b).
[31] 47 CFR 68.215(c).

Insulated Wires and Cables (UL 83), Flexible Cord and Fixture Wire (UL 62) and Service-Entrance Cables (UL 854).

Among the aspects and parameters of the wires, cables and cords tested are: the conductors (including dimensions, resistance and corrosion), the insulation and jacket material (including thickness and physical properties) and standards related to: heat shock, deformation, cold bend, flexibility at low temperature, impact at abnormally low temperature, crushing resistance, dielectric tests, spark tests, insulation resistance, stability factors, mechanical water absorption, swelling and blistering in water, flame tests, sunlight resistance, leakage, impact resistance, abrasion, flexing tests, and the durability of printing on the wires, cables and cords.

UL 1863 Standard for Communications-Circuit Accessories

These requirements cover telecommunications-circuit accessories such as: jack and plug assemblies, quick-connect terminal assemblies, telephone wall plates, telephone extension cords, cross-connect terminal block assemblies, maintenance terminal modules, terminal enclosures, cable-splice enclosures, network-interface devices, wire-guide assemblies and connector boxes. Issues considered in the standard include: the construction and performance of the devices, the risk of injury to persons and device markings.

UL 94 Test for Flammability of Plastic Materials for Parts in Devices and Appliances

These requirements cover tests for the flammability of plastic materials used for parts in devices and appliances. The standards are intended to serve as a preliminary indication of the acceptability of such parts with respect to flammability for a particular application. CPE such as telephone sets are among the devices covered by this standard. The document establishes conditions for several different burning tests.

UL 1459 Standard for Telephone Equipment

These requirements cover telecommunications equipment such as: telephone answering devices, residential telephone instruments, telephone dialers, cordless telephones, key systems and private branch exchange equipment that is intended to be electrically connected to a telecommunications network that has an operating voltage to ground that does not exceed 200 volts peak, 300 volts peak to peak and 150 volts root mean square. These requirements do not cover cellular telephones or similar receiver/transmitter type devices.

For such equipment, specifications and testing procedures are provided concerning issues such as: construction, protection against injury to persons, performance, manufacturing and production tests and markings. Special requirements also are given for batteries and transformers used in such telecommunications equipment.

3.3 Performance and Compatibility

The TIA/EIA standards specified in Jamaica (and listed in Section 2.8 above) are only some of the requirements that might be adopted to ensure that inside wiring and CPE will perform as intended and be functionally compatible with LEC networks. This section of the report contains a list of standards that is expanded beyond those specified in Jamaica. Standards for inside wiring are discussed first, followed by a discussion of standards for CPE.

TIA/EIA-568-A Commercial Building Telecommunications Cabling Standard

This standard was adopted in Jamaica. The standard specifies a generic telecommunications cabling system for commercial buildings that will support a multiproduct, multivendor environment. The purpose of this standard is to enable the planning and installation of a structured cabling system for commercial buildings. Such planning is important because the installation of cabling systems during building construction or renovation is significantly less expensive and less disruptive than after the building is occupied. Issues covered by the standard include: horizontal cabling, backbone cabling, telecommunications work areas and closets, equipment rooms, entrance facilities, unshielded and shielded cabling systems, optical fiber cabling systems, and hybrid and undercarpet cables.

TIA/EIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces

The purpose of this standard is to specify explicit design and construction practices in support of telecommunications equipment within and between commercial buildings. The standard is designed for architects, engineers and members of the construction industry. Standards are given for spaces (rooms and areas) and physical pathways into and through which telecommunications equipment is installed. For cable pathways, the standard addresses: underfloor pathways, access floors, conduits, cable trays and wireways, ceiling pathways and perimeter pathways.

Among the types of spaces considered are: work areas, telecommunications closets, equipment rooms and entrance facilities.

TIA/EIA-570-A Residential Telecommunications Cabling Standard

The purpose of this document is to standardize requirements for residential telecommunication cabling, including facilities that are necessary for existing and emerging telecommunications services. Within this standard, services are correlated to grades of cabling required for residential units. The cabling standards include support for: voice, data, video, multimedia, home automation systems, environmental control, security, audio, television, sensors, alarms and intercoms. This standard is intended to be implemented in new construction, additions and remodeling in single and multi-tenant residential buildings.

TIA/EIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

The purpose of this standard is to provide a uniform administrative scheme for the documentation (including labels, records, drawings, reports and work orders) for cables, termination hardware, patching and cross-connect facilities, conduits and other cable pathways, telecommunications closets and other telecommunications spaces. The standard is designed to provide a uniform administration scheme that is independent of applications and which may change several times throughout the life of a building. The standard establishes guidelines for owners, end users, manufacturers, consultants, contractors, designers, installers and facilities administrators involved in the administration of the telecommunications infrastructure in a building.

TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications

The purpose of this standard is to enable the planning, design and installation of telecommunications grounding systems within a building with or without prior knowledge of the telecommunication systems that subsequently will be installed. The specified grounding and bonding infrastructure supports a multivendor, multiproduct environment and also the grounding practices for various systems that may be installed on customer premises.

TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Cabling Standard

The purpose of this standard is to provide requirements for use in designing the telecommunications pathways and spaces and the cabling installed *between* buildings or points in a customer-owned campus environment. Customer owned campus facilities are often termed "outside plant," since the facilities closely resemble the outside plant used by LECs to connect customers to LEC central offices.

TIA/EIA-464-B Requirements for Private Branch Exchange (PBX) Switching Equipment

This is the first standard in this list of TIA/EIA standards that pertains to CPE. The standard covers digital private branch exchange (PBX) switches. A PBX is a device that performs switching functions between station apparatus interfaces, between the station apparatus interfaces and network (central office) and special trunk interfaces, and between trunk (network and special trunk) interfaces. Station interfaces are specified for both conventional analog and digital station sets; interfaces for both analog and digital trunks also are considered. Among the issues covered are: interface requirements, transmission requirements, signaling requirements, loss plans and synchronization plans.

TIA/EIA-470-B Telecommunications-Telephone Terminal Equipment — Performance and Compatibility Requirements for Telephone Sets with Loop Signalling

This standard was adopted in Jamaica. The standard provides performance and compatibility requirements for telephone sets intended for direct tip and ring connection to central office (CO) or private branch exchange (PBX) lines. The requirements are based on present telecommunication plant characteristics at the telephone set interface. These requirements apply only to telephone sets intended for single party service and do not include requirements for user safety. Among the matters considered are: transmission characteristics, alerting characteristics, resistance and impedance characteristics, mechanical requirements, dial pulse network control signaling and dual-tone multifrequency signaling.

End